The Organization and Analysis of Research Data

Naomichi YAGUCHI

There is no manual to give instructions on how you should organize the data you have collected in the field and the data you obtained from related literature before your fieldwork, or how you should be collating that data into a final report; each researcher will have his or her own methods. These methods have likely either been passed on orally or have been developed through experience, but nevertheless I will try to give an outline of the basic approaches to handling data and my own methods. I will begin with a general outline, then move on to more specific examples.

1. What is research data?

There are many categories of research, but quantitative research and qualitative research are the clearest examples of the characteristics of all research. Quantitative research tends to involve using written questionnaires, oral interviews or telephone interviews to gather large amounts of information, which is then subject to statistical analysis; such research often comprises social surveying. This sort of research looks at figures and amounts—how much of what type of thing—and therefore requires a large number of parameters, meaning that detailed individual case studies are rarely conducted. As such, the information obtained through quantitative research has a tendency to be somewhat superficial, but by conducting statistical analysis it is possible to glean results that are unbiased overall. By contrast, qualitative fieldwork is focused on obtaining detailed information, through, for example, the observation of a limited number of case studies and reference to written texts. Typical qualitative research examples include surveys in which interviews are conducted with a select few research targets focused on obtaining detailed information; and "participant observation" studies in which the researcher lives among the research target group for an extended period to observe and record the behavior and dialogue of the target people. Qualitative research is focused principally on establishing the details of how the behavior and thinking of individuals, or how individual events, become established and the consequences of that behavior or those events, so it is not possible to handle large numbers of case studies. As such, qualitative research has a tendency to produce information that is somewhat biased, but equally is more able to uncover the subtle processes frequently missed in quantitative research, and phenomena previously not considered by the researcher. It is not a case of one or the other being correct or of one being better than the other; they are complementary approaches and should be used as such.

Here, we will define research data as the data recorded in relation to research points determined in advance. This will usually comprise the data contained in your fieldnotes—the notebook used to record that seen and heard in the field. This will include all notes, records of interviews, journals and diaries, and any information obtained while in the field. Let us also assume it includes all relevant literature, such as the written texts referred to in advance of fieldwork.

2. Organizing and analyzing data

Analysis is the act of dissecting the information contained in your various research data, then reconfiguring and presenting it according to a certain specific perspective. The objective of analysis is to take the information hidden in the detailed research data (raw data) and present it in a more accessible way. Humans have a limited capacity for recognition, and if given more than a certain amount of detailed information are unable to identify conclusions from it. When analyzing research data, there is in the first instance a need to organize the data, removing all superfluous information to ensure that the relevant information is thrown into relief.

However, being faced with large amounts of data can be intimidating—how will it be possible to conduct consistent data analysis focused on a narrowly defined point? The first stage is to read the research data; this is extremely important. All the research data, including fieldnotes, should be read as a single accumulation of data; it should be understood that the entire set of records from the field is something that was developed over a long period of time.

By considering individual datum as cohesive sources, and by conducting meticulous and thorough consideration and analysis, your original ideas can be developed and refined.

At this stage, it is possible to separate your research data into a number of different categories. It will be necessary to use codes (numbers or symbols) to categorize your research data. By reviewing your research data and considering its implications, you will be able to gain repeated conceptual and analytical insights. Those that converge should be placed in the same category. At this point, the unique view of the researcher should become clear. In other words, the way in which categories are created and the method of classification will differ according to the interests of the researcher. Data analysis is essentially the process of reconfiguring data in view of a specific objective; as the objectives change so will the analysis required. There are two methods: focusing on a specific part of the data and organizing it quantitatively, and organizing data qualitatively, by checking, categorizing and giving name to the significance of the very content of the concepts contained in the data and of individual observations.

In this way, it becomes possible to discover what relationships exist among the research data and to establish a hypothesis and begin to consider it. When establishing a hypothesis, it is necessary to be aware of certain things: that you must wish to answer the questions posed by your hypothesis; that your hypothesis will have some kind of relationship with other hypotheses and theories; that the authenticity of the hypothesis may be judged by data analysis. Read the research data, categorize the data, formulate a hypothesis. The organization and analysis of research is, essentially, the repetition of this process.

3. Specific example: Hoysala temple architecture, India

Let us now consider a specific example: part of the data I collected on Hoysala temple architecture, the subject of my research when I was a student. Hoysala temples were built between the 11th and 14th century in India, mostly in the southern parts of the area now known as Karnataka state, under the direction of the ruling Hindu dynasty, Hoysalas. To briefly describe the features of the temple architecture, each temple will feature a number of worship halls, at each of which a different deity is enshrined, making the temples polydeist; the layout of the external temple walls are jagged, forming a star shape; and the main temple hall is built on an elevated pedestal.

In total, I collected data on 428 such Hoysala temples. The process by which I read that data, classified it and used it to derive a hypothesis, in other words the process by which I reconfigured all or part of the data according to a number of different perspectives to present it as different stories to the reader, is equivalent to the process described above for the organization and analysis of data. Previous studies on this temple architecture have revealed how they came to be built and their structural features.

One example of Hoysala temple architecture is the Chennakesava Temple in Somanathapura (Fig. 1). Figure 2 shows an example of a database entry on this temple. The entry includes the temple location, year of construction, name of the person who constructed the temple, layout of

Figure 1 Chennakesava Temple in Somanathapura

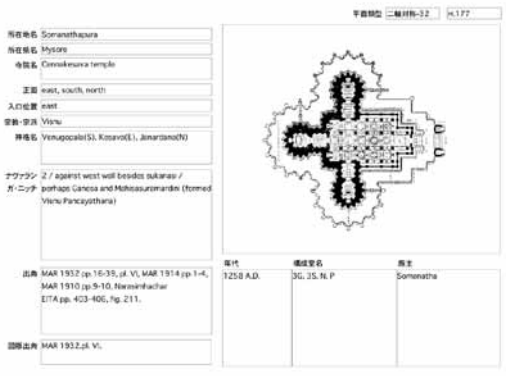

Figure 2 Database example (Chennakesava Temple)

平面類型	神格A	宗教-宗派	正面	入口位置	番号	所在地名	寺院名	構成室名
二軸対称-3	S	Siva	east, south, north	east	H.162	Gorur [Gorūvur (inscription)]	Trikutesvara temple	3G, 3S, N, P
二軸対称-3	V	Visnu	east, south, north	east	H.165	Hole-Narasipura	Laksminarasimh a temple	3G, 3S, N, P(E)
二軸対称-3	S	Siva	east, south, west	south	H.163	Keresante	Trikutesvara temple	3G(W,N,E), 3S (W,N, E), N, P
二軸対称-3	S	Siva	east, south, west	south	H.164	Kogginur	Isvara temple	3G, 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Visnu, Surya	east, south, west	south	H.170	Anagodu	Siddhesvara temple	3G, 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Visnu, Brahma	east, south, west	south	H.171	Bada	Kodibasavanna temple	3G, 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Visnu, Surya	east, south, west	south	H.172	Catcathalli (Catacattahalli)	Cattesvara temple	3G, 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Surya	east, south, west	south	H.173	Lokikere	Kodikalleswara temple	3G, 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Visnu, Surya	east, south, west	south	H.174	Malalakere	Kalleswara temple	3G (W,N,E), 3S, N, P
二軸対称-3 (非対称)	wG	Siva, Harihara	east, south, west	south	H.175	Sagali	Mallikarjuna temple	3G,3S, N, P
二軸対称-31	V	Visnu	east, south, north	east	H.176	Bhadravati	Laksminarasimh a temple	3G, 3S, N, extra ankana(E), P(E)
二軸対称-32	V	Visnu	east, south, north	east	H.177	Somanathapura	Cennakesava temple	3G, 3S, N, P
二軸対称-32 (非対称)	wG	Siva, Visnu, Brahma	east, south, west	south	H.178	Magala	Venugopala temple	3G, 3S, N
二軸対称-3 m	wG	Siva, Visnu	east, south, north	east	H.179	Bandanike	Trimurti temple	3G(S,W,N), 3S (S,W, N), N, P(E), M

Figure 3 Example of sorted data

the temple grounds, direction faced by temple entrance names and locations of the deities enshrined, stored together with a plan view. This particular temple is one of the best examples of Hoysala temple architecture, and features three shrines, each for the worship of a different incarnation of the Hindu God Vishnu: Chennakesava as the main shrine directly facing the temple entrance, flanked by Venugopala to the left and Janardhana to the right. These three shrines for the three incarnations are connected by a single shared *mandapa* porch. The outside of the temple walls are decorated with intricate carvings, including reliefs of gods, images of women and architectural motifs. The interior of the temple is also decorated with extremely intricate carvings, exemplified by the shrine doors and pillars.

As I was building the database (inputting the research data), I thought about many different things. In my case, this process of creating and populating fields in the database was the equivalent of "reading" the research data. The total number of temples making up my research data, at just 428, was entirely insufficient as quantitative data, but it was a significant amount of data in qualitative terms, considering that my research subject was temple architecture. As I looked at the plan views of the temples, any number of questions came to me: do the temples resemble each other in form? Which is the principal deity? Is there any regional or chronological bias in terms of principal deities? What is the relationship between the location of the shrines for the principal and other deities, and the shrines and *mandapa* porches? Is there any consistency in the location of the entrance to the main temple relative to the principal deity shrine? In order to answer these questions, I added new fields to the database, re-classified the data according to those fields, sorted it, and tried to find whether there was any relationship among the data. In other words, I classified my research data according to various categories and organized it according to those categories.

For example, I thought about why Hoysala temples, one of the features of which is that they contain a number of shrines, would have been built and why in those locations. This is a common sense, rather obvious perspective, but I reconfigured the data according to the number of shrines and *mandapa* porches, and deities enshrined, while sorting through the data to establish whether there were any strong relationships between factors such as the period in which the temples were constructed, the social rank of the people who built the temple and the location of the temple (the region in which the temple was constructed), and the temple layout and number of shrines.

I sorted through the data using formats I had created myself, dividing it into various categories and classifying it sequentially. Luckily, now, database software has developed considerably, and once data input has been completed, it is possible to instantaneously and automatically classify and sort data. Furthermore, by using codes that can function as key words, it is possible to identify the distinctive features of each category.

Finally, I organized the data according to the deities enshrined in each temple, their locations in those temples and their location in relation to the entrance, using as the code the line leading from the entrance to the principal deity. In other words, I uncovered a plausible theory for the relationship between the line leading to the shrine for the principle deity and the symmetry of the temple grounds.

In this case, data is organized and analyzed through a process of collecting data in the field, using a database comprising categories based on that data to classify the data and then sorting the data. For me, in this example, "data organization" was equivalent to the process of creating a database, and "data analysis" to the process of sorting through that database from a number of different perspectives. The description of how this was conducted, from the initial ideas sequentially through to the conclusions of data analysis,

comprises the report or paper that is the research output. At the risk of repeating myself, I must again state that this is the method that worked best for me, and that individual researchers use their own unique methods to organize research data.

Fieldwork entails a certain element of "familiarization rather than learning", and indeed the real joy of fieldwork is handling unexpected situations as they arise in the field and the creativity and innovation exercised by individuals with regard to research techniques. So my strongest recommendation would be to always start off by giving your ideas a go.